Parisharam (2024)

Relations and Functions

DPP-03

1. If R is a relation from a set A to set B, then:
(1) $R \subset B \times A$ (2) $R \subset A \times B$
(3) $R = A \times B$ (4) $A \times B \subset R$

2. Let A and B are two sets such that $A \times B$ consists of 6 elements. If three elements of $A \times B$ = (1, 2), (2, 3),
(4, 3) then the remaining order pairs of $A \times B$ are:
(1) (1, 3), (2, 2), (4,2)
(2) (3, 1), (2, 2), (4, 2)
(3) (3, 1), (2, 4), (2, 2)
(4) (1, 3), (2, 2), (2, 4)

3. Let $A = \{4, 5, 7\}$ and $B = \{2, 4, 6\}$ be two sets and let a relation R be a relation from A to B is defined by R: $\{(x, y) : x < y, x \in A, y \in B\}$ then the difference between the sum of elements of domain and range of R is:
(1) 2 (2) 3
(3) 4 (4) 5

4. List all the relations on the set A = {–5, 5}.

5. Let A = {1, 3, 6, 9}. Let R be the relation on A defined by $R = \{(x, y) : x \in A, y \in A$ and x divides $y\}$. Find R in roster form.

6. Find the range of the relation R given by $R = \{(x, y) : x \in N, y \in N$ and $x^2 + y^2 \leq 24\}$

7. Determine domain and range of the relation $R = \{(x, y) : y = |x - 1|, x \in Z$ and $|x| \leq 3\}$

8. Let A = {2, 3, 4, 5} then how many relations can be defined on set A?
(1) $(16)^2$
(2) $(2)^{14}$
(3) $(16)^4$
(4) $(4)^{16}$

Note: Kindly find the Video Solution of DPPs Questions in the DPPs Section.

Answer Key

1. **(2)**
2. **(1)**
3. **(2)**
4. **See the solution**
5. **See the solution**
6. **See the solution**
7. **See the solution**
8. **(3)**

Solutions

1. **(2)**

2. **(1)**

3. **(2)**

4. Given that $A = \{-5, 5\}$
$A \times A = \{(-5, -5), (-5, 5), (5, -5), (5, 5)\}$
Hence all the relations on A are
$\{\ \}, (-5, -5)\},\{(-5, 5)\},\{(5, -5)\},\{(5, 5)\},\{(-5, -5), (-5, 5)\}, (-5, -5), (5, -5),\{(-5, -5),(5, 5)\},\{(-5, 5), (5, -5)\},\{(-5, 5),(5, 5)\},\{(5, -5),(5, 5)\},\{(-5, -5), (-5, 5), (5, -5)\}\ (-5, -5), (-5, 5), (5, 5)\}, \{(-5, -5), (5, -5), (5, 5)\}, \{(-5, 5), (5, -5), (5, 5)\}, \{(-5, -5), (-5, 5), (5, -5), (5, 5)\}$

5. Given that $A = \{1, 3, 6, 9\}$
Here, $R = \{(x, y) : x \in A, y \in A$ and x divides $y\}$
In roster form, $R = \{(1, 1), (1, 3), (1, 6), (1, 9), (3, 3), (3, 6), (3, 9), (6, 6), (9, 9)\}$

6. Here, $R = \{(x, y) : x \in N, y \in N$ and $-x^2 + y^2 \leq 24\}$
$R = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (3, 3), (4, 1), (4, 2)\}$
Range of $R = \{1, 2, 3, 4\}$

7. Let $R = \{(x, y) : y = |x - 1|, x \in z$ and $|x| \leq 3\}$
$= \{(x, y) : y = |x - 1|, x \in z$ and $-3 \leq x \leq 3\}$
$[\because |x| \leq 3 \Rightarrow -3 \leq x \leq 3]$
$= \{(x, y) : y = |x - 1|, x = -3, -2, -1, 0, 1, 2, 3\}$
Since $y = |x - 1|$
$\therefore y = 4, 3, 2, 1, 0, 1, 2$
Hence $R = \{(-3, 4), (-2, 3), (-1, 2), (0, 1), (1, 0), (2, 1), (3, 2)\}$
$\therefore$ Domain of R = set of first elements of all ordered pairs belonging to $R = \{-3, -2, -1, 0, 1, 2, 3\}$
Range of R = set of second elements of all ordered pairs belonging to $R = \{0, 1, 2, 3, 4\}$

8. **(3)**

PW Web/App - https://smart.link/7wwosivoicgd4

Library- https://smart.link/sdfez8ejd80if